WEEDS and TURF

Monthly news for contract sprayers of weeds, turf, ornamentals, and trees

What's new in

Shade Tree Spraying

Which chemicals to use to curb tree pests W-8

Details on Sevin . . . W-16

AUGUST
1963

39th International Shade Tree Conference meets this month in Toronto . . . W-20

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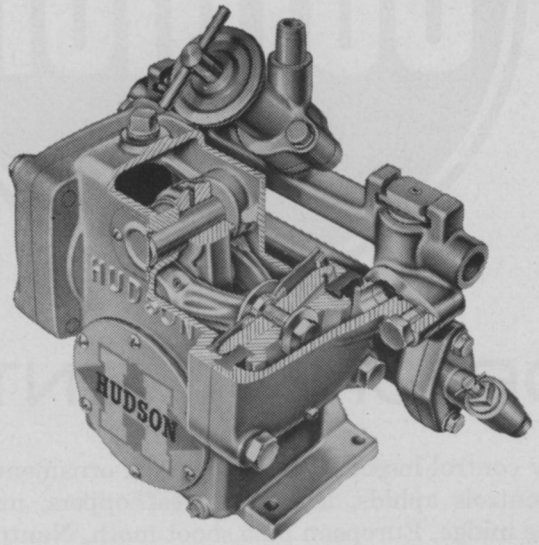

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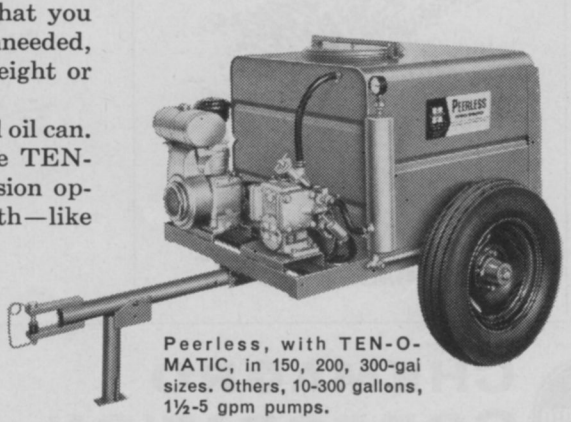

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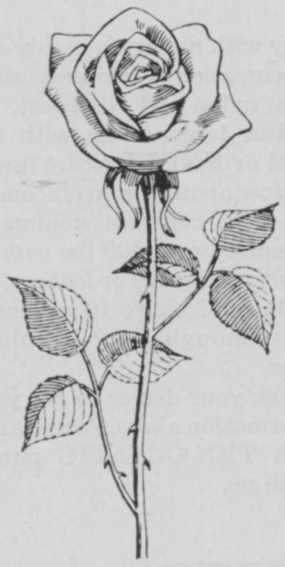

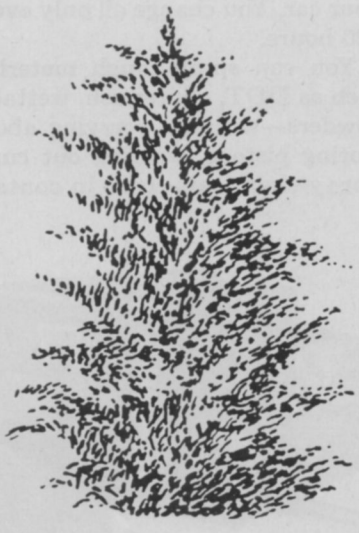

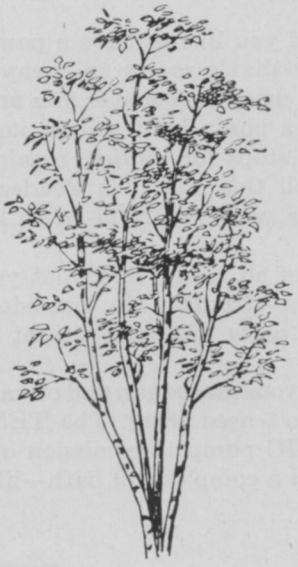

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WEEDS and TURF
PEST CONTROL
A SECTION OF PEST CONTROL MAGAZINE

August, 1963

Features

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Published Monthly by
TRADE MAGAZINES, INC.
1900 Euclid Avenue
Cleveland 15, Ohio

JAMES A. NELSON
Publisher

CHARLES D. WEBB
Editor

WALLIS W. WOOD
Editorial Assistant

DAVID E. SCHNEIDER
Staff Biologist

R. J. HOFFER
Circulation Manager

Advertising Representatives
National Headquarters
1900 Euclid Avenue
Cleveland 15, Ohio
Phone: Area Code: 216 + 771-4169

New York City
Billingslea & Ficke
420 Lexington Avenue
Phone: Area Code: 212 + LExington 2-3667

Single Copies: 35 cents

Annual Rate for
12 Monthly Issues: $3.00

How much does it cost?

A tight rein on what contract applicators are spending for material and labor may spell the difference between successful business management and bankruptcy.

Any businessman, to operate on a sensible basis, must insist on a sound analysis of costs. This need for cost knowledge is particularly important in service industries such as contract turf care, weed control, or tree maintenance.

Reasons for the elusive nature of cost analysis in custom application are twofold. First of all, it is doubtful that any two jobs, regardless of similarity of size, weed or insect problem, or other qualities, will ever cost the same to complete. This is because every fickle whim of the weather affects all factors involved in the job, and because few jobs ever take the same amount of time to complete.

CAs should also beware of the callback. If an operator figures his costs on a job, takes his reasonable profit, only to find he must go back a second time, there will be unrealistic figures on the analysis sheet.

For these reasons, CAs should be doubly careful when they analyze how much is being spent to operate their businesses. It might even be advisable to examine a 12-month period to get the average number of callbacks which were made, and include this factor in the price of *every* job.

Then, too, adverse weather conditions which might have a derogatory effect on profits should be looked at closely. In the price of each job, figure a little extra margin for the unexpected shower or windstorm which may prevent your sprayman from completing his job.

In these days of fiscal carelessness, the American businessman must be extra careful not to fall into the trap of inadequate cost analysis.

Contents of this Issue ® Trade Magazines, Inc., 1963

POTTS MIST BLOWERS

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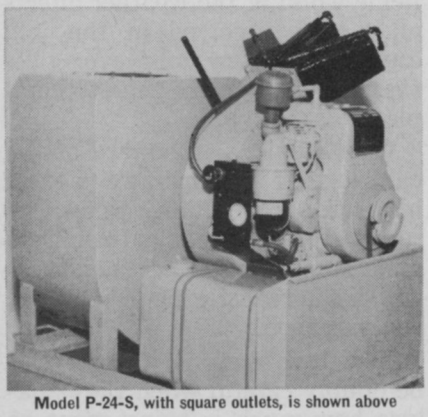
P-24-E Economy model, with single outlet or triple outlet, does not include spray tank. All features of P-24-S, including standard pumps, pressure regulators, gauges, etc. Weighs 265 lbs. $710.

A granule and pellet distributor is available as auxiliary equipment for each of the S. F. Potts Mist Blowers at $50-75, for applying insecticides, herbicides, aerosols, or fertilizers, while avoiding spray drifts. Tractor P.T.O. units are also available.



Model P-24-S, with square outlets, is shown above

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CAs for Golf Courses?

I have heard the remark made that at the Feb. 63 Golf and Turf Convention in San Diego a speaker (possibly a cost analyst) advised golf superintendents to throw away their costly spray rigs, supplies, and labor factors involved, and hire a CA to save money and get better results on fertilizing, pest and disease control, and soil conditioning.

Good advice, I'd say.

I wonder if you can tell me who made such a recommendation? I'd like to be able to quote this if someone did indeed so state.

James G. McClure

Custom Fertilizer Sales and Service
Vista, Calif.

Perhaps some readers who attended these sessions can let us know whether or not such a statement was made, and if so, who made it. Ed.

Which Railroad?

In connection with the article on railway weed control in the June issue of *Weeds and Turf*, there is a photo of a railwheel-mounted tank truck. Would you please advise on which railroad this equipment is used?

E. H. Waring

Chief Engineer
The Denver and Rio Grande
Western Railroad Co.
Denver, Colo.

The tank truck was specially built for the New York Central Railway, and is used by them for spreading herbicides along their rights-of-way. Ed.

Spray Boom Marker?

On the cover of your April 1963 issue there is a picture of a spray rig with something hanging from the end of the spray boom and dragging on the ground. Is this some sort of marking device to guide the operator? If so, could you please possibly advise us who sells or manufactures that device? We will be greatly obliged to you for any help at all in this respect.

We have benefited from much of the information published in your magazine. Have you ever published or considered preparing an article on how to really get uniform spray coverage of herbicides?

Frank Lichtig

Gramaslindas, Cia.
Dorado, Puerto Rico

We are considering publication of an article on how to get uniform spray coverage of herbicides, and hope that it can be scheduled in an early issue. The object in the photo is indeed a marker, and perhaps the letter below will produce additional information on its success. Ed.

Chain Marker Drag?

I am wondering if there was an article at some time on the chain marker drag on weed boom method of marking, as shown on the cover picture of the April 1963 issue of *Weeds and Turf.*

Any information which you can furnish me in this regard would be very much appreciated.

William H. Wilmot

Summit Hall Turf Farm, Inc.
Gaithersburg, Maryland

Weeds and Turf *has not yet published an article on this system of marking. Perhaps some readers would like to communicate with us, or directly with Mr. Wilmot, on the value and technique of this marking method.* Ed.

W&T Hits Our Interests

We enjoy reading your magazine as many articles hit right on our interests.

We've had good success with atrazine applied a week or two after verticutting St. Augustine lawns. Thought you might want to pass this on to other operators.

Art Griffes

House and Garden Lawn Service
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Weeds and Turf welcomes expressions of opinions from its readers. Send ideas and comments briefly as possible to Charles D. Webb, Editor, Weeds and Turf, 1900 Euclid Ave. Cleveland 15, Ohio.

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How to Recognize and Control Major Shade Tree Pests

By FRANKLIN R. HALL

Field Service Representative to Arborists
Niagara Chemical Division
FMC Corporation
Middleport, New York

Timing of application is one of many critical factors in successful control of shade tree pests, author Hall points out in this detailed analysis of proper techniques.

ANYONE who doubts the enormity of the pest problems which plague contract applicators, arborists, nurserymen, and others with an interest in growing plant life, need only glance at the figures.

Entomologists have actually classified between 600,000 and 1.5 million different species. New insects are discovered every year, and it has been estimated that between 2.5 and 10 million different kinds exist somewhere on the earth.

Shade trees in the nation's parks, yards, and forests serve as a vast target for many of these insects as well as numerous disease pests. This year many thousands of beautiful and useful trees will die due to insect or fungus injury. The purpose of this discussion is to point out how to recognize some of the more severe pests which can create havoc in trees, and to list measures for controlling them effectively.

Many factors influence the life of an insect — weather, host plants, parasites, predators, etc. Sudden rises in the number of insects in a given area may be the result of one or a combination of these factors.

Recently several insects have been noted for such cyclic appearances. Among these are gypsy moths and cankerworms, both of which are expected in large numbers again this year. A heavier than usual population of Linden looper has also been forecast for 1963. Even insects not generally regarded as economically significant will occasionally reach epidemic proportions and become a major problem. Plant diseases, too, tend to run in cycles and, again, a complexity of factors contribute to this. Reasons for these increases are not always apparent and create interesting and challenging studies for the entomologist.

Get the Most from Pesticides

There are many factors which affect the efficiency of insect control via pesticides. Perhaps three of the most important are: (1) Use of the proper chemical for the insect or disease in question; (2) Correct timing. Habits of the pest influence the timing and frequency of the applications; (3) Sufficient pressure with the proper equipment to secure thorough coverage

of the foliage of the infested trees. Knowing where to spray is as important as how to spray.

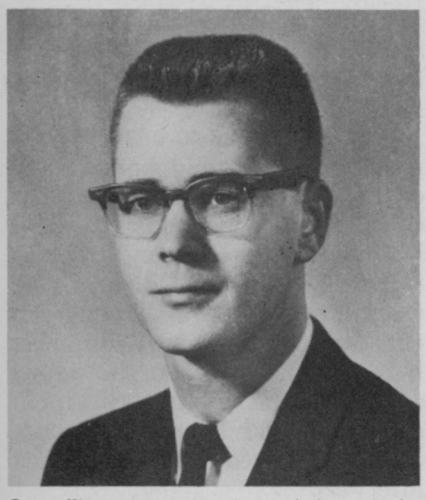
Some further points to consider are:

- Spray coverage should be thorough so no small individual pest will be missed.
- Diseases, in particular, should be controlled by preventive treatments — insects, too, when an infestation is almost certain.
- Keep a record of treatments and schedules used from year to year.
- Always read the pesticide label carefully and fully.

All pesticide formulations available to the CA, arborist, nurseryman, and others, are packed in containers with a label attached. These labels contain information regarding the toxicity of the ingredients, recommended uses, rates and precautions. The label represents an important contribution of the manufacturer in the field of research, and frequently indicates an expenditure in excess of $1,500,000 dollars. It is also the basis upon which USDA registrations for material usage have been obtained. Therefore it should be closely read and followed.

Chief Tree Insects to Beware

Out of the hundreds of insect and disease pests which exist, only a relative few cause significant damage to shade trees. Nevertheless, if left unchecked, one or more of these species can leave behind a costly trail of damage. Following is a brief discussion of some of the more commonly occurring tree pests — how to detect and control them:



Controlling tree pests is a daily task for Franklin R. Hall, arborists' field service representative from Niagara Chemical.

Aphids

One of the more consistent year to year enemies of shade trees is the aphid. There is scarcely a living plant, cultivated or wild, that does not serve as a host for these prolific sucking insects.

Aphids — tiny, soft-bodied pests — fall into two principal groups, according to the type of damage they inflict. One group affects development of young shoots or leaves, while the other produces gall-like swelling on twigs.

The group which attacks shoots and leaves causes loss of vigor, curling, or growth distortion in trees. They also produce a sticky honeydew substance on which a sooty fungus often develops. Their most frequent victims are birch, linden, larch, maple, oak, elm, and various fruit trees. They overwinter as eggs and become active in the spring.

Gall-producing aphids are particularly partial to balsam fir, Douglas fir, and spruce trees, giving them a ragged appearance and destroying their ornamental value. Resulting galls also interfere with normal twig development and may cause the death of new growth. This type of aphid overwinters as an immature adult form on the twig, and matures in mid-May.

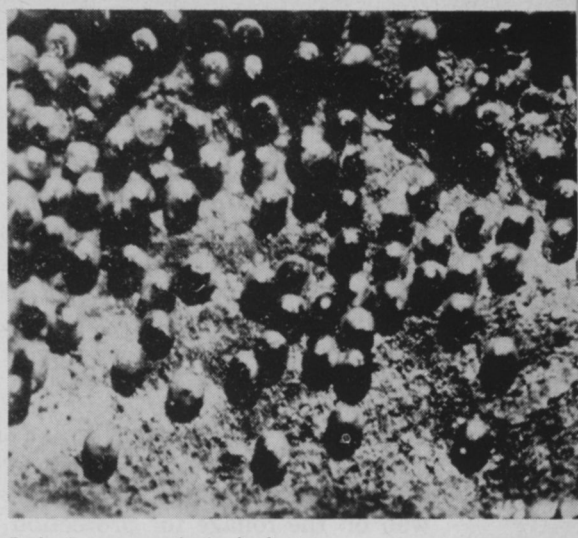
Species which overwinter in the egg stage should be sprayed early in the spring, when buds are expanding. In particular, leaf-curling species should be treated before leaves curl and the pests become less accessible to sprays.

Species which feed on main stems and branches can be sprayed once they become numerous. For gall-producing aphids, control may be effected by spraying in the spring before buds open, or fall.

Periodic inspection, to detect the presence of aphids or their eggs, should be made. Once it is decided that control measures are needed, there are several materials from which to choose. Among those most commonly used are: Thiodan, Sevin, lindane, and malathion.

Cankerworms

Spring and fall cankerworms are common native pests of most deciduous trees. The striped caterpillars (also known as measuring worms, inch worms, or loopers) when fully grown are slightly less than one inch in length. The spring cankerworm larvae vary from red to yellowish green, yellowish brown, or black, while the fall cankerworm larvae range from light green to brownish green.



Red mite eggs on the bark of a tree are a sign of impending trouble; if controlled before they hatch, a major infestation and almost certain leaf damage can be prevented.

Cankerworms destroy the leaves and buds of a great many of the common deciduous trees, but prefer the elm and apple. The caterpillars of both species appear in early May and feed for three weeks or a month. The young caterpillars skeletonize newly developing foliage, and when they are more mature, devour all but the midribs and larger veins. If an infestation is severe, the trees may be completely defoliated. Two or three successive years of severe defoliation can result in death of the tree.

The insecticidal control for both species of cankerworms is the same. Several materials are available. DDT, lead arsenate, methoxychlor, and more recently, Sevin, are most frequently used. If thoroughly applied in the correct proportions and at the proper time, they will give excellent results.

Mites

Brown discoloration of foliage and/or premature leaf drop indicates a likelihood of the presence of mites. These tiny pests are becoming more and more of a problem each year.

There are several kinds of mites. Those frequently found in large

numbers on deciduous trees include the two-spotted mite or common red spider, and the European red mite. On certain conifers, spruce mites are also troublesome. Conditions favoring buildups of all species are: dry periods in midsummer, crowded trees, poor soil conditions, and the absence of natural enemies.

Mites suck juices from the leaves of trees and in severe infestations can cause complete defoliation. Their minute size frequently permits them to be overlooked. Two-spotted mites and spruce mites, however, spin a conspicuous web on the foliage for protection of their young and eggs, and this webbing gives the foliage a readily detectable dusty appearance.

Foliage should be inspected periodically to forestall rapid buildup of mites. This can be done by holding a piece of white paper directly under a branch and tapping the foliage sharply. Mites, if present, will drop to the paper.

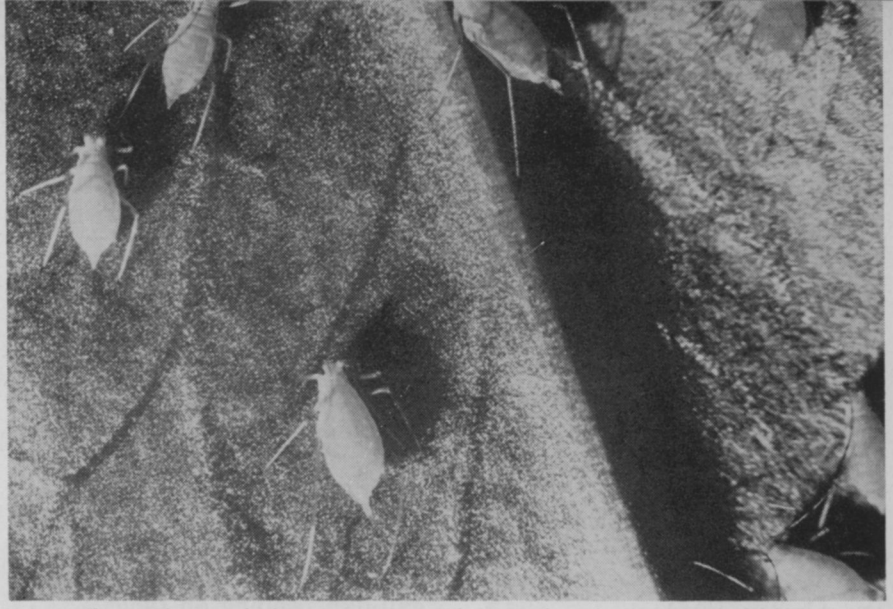
Thorough, early spraying will prevent serious mite infestations. Several effective chemicals are available for control of these pests (see Table I). Recently, new label claims on Ethion .67 Superior 60 Oil E.C. have been accepted by the USDA for control of two-spotted mites and scale on certain ornamentals. The new formulation is regarded as having a high potential for a wide usage as a summer oil.

Gypsy Moth

Oak is probably the preferred host of the gypsy moth. Other tree species favored are poplar, willow, basswood, beech, birch, cherry, larch, maple. The recreational and aesthetic value of park and forest shade trees can be seriously threatened by this pest.

Damage is caused by the larvae, which feed on foliage. When an area is heavily infested, few host species are ignored by the larger larvae. Records kept during many years have shown that oaks are damaged most severely. The trees seldom die unless leaf drop occurs in successive years, but a single defoliation causes considerable loss in normal growth.

Newly hatched larvae usually spin silken threads and swing on these while traveling through the foliage. They can be blown considerable distances by the wind, and frequently carry an infestation over many acres.



Universally troublesome shade tree pests — aphids — are shown here attacking a leaf. This particular variety of aphid causes curling or distortion of leaves and produces a sticky honeydew substance on which fungus can develop.

Gypsy moth larvae are easily recognized by their size and color characteristics. Full grown, the larva is between 1½ to 2½ inches long. The body is dark gray or brown, and clothed with prominent hairs. There are eleven pairs of spots along the back. The five nearest the head are blue, the rest red. When fully grown, they spin a few strands of silk and seek a place to pupate, a period which requires from 1½ to 2 weeks. The males may be seen flying in a zigzag pattern, particularly during warm days. The nonflying females remain on the trees to lay their eggs.

In areas where the insect is known to occur and its abundance is increasing, application of one of several insecticides is an effective control measure. Solutions of DDT and oil have been used successfully in forested areas since 1946. Lead arsenate has merit. Sevin is highly effective for this use and is extremely safe where humans and wild life are involved.

Pesticide applications should take place during the early part of the feeding period — late May or early June, depending upon the climatic factors and locality.

Borers

The significance of borers is their ability to weaken and stunt the growth of trees by making numerous galleries or by girdling the cambium of the trunk and/or main branches of the tree. Their presence can often be detected by a sparse covering of foliage at the top of the tree, wilting of the branches, and/or sap and sawdust coming from holes in trunks and branches. It has been found that old and less vigorous trees are more susceptible to attack by borers.

Borers can be divided into two basic groups: (a) those which have a caterpillar-type larval stage, and (b) those which have a grub-type larval stage. The caterpillar type is most common on ash, oak, and peach, and embraces such destructive insects as the carpenterworm and leopard moth. The grub type is most prevalent on willow, locust, maple, birch, poplar, oak, mountain ash, apple, and others. Among the grub type are "roundheaded borers" and "flatheaded" borers — so named because of the appearance of the body just behind the head of the larva.

Some species bore a gallery into the host tree to serve as a depository for eggs. The length of tunneling done by larvae can vary from a few inches to 4 or 5 feet. Most borers complete their life cycle in a year.

One of the most effective approaches to curbing borers is to enhance vigorous growing conditions. Spraying to control other insects and disease and prompt removal of weakened or dying trees are also advantageous. An effective time to spray for most borer species is when the adults are active and laying eggs. Applications should be repeated once or twice as needed at 2 to 3 week intervals.

DDT is effective in halting most caterpillar and grub-type borers,

Table of Control Measures for Major Shade Tree Pests

Pest	Material & Formulation	Amount per 100 gals. water	Remarks
Aphids	Thiodan 50% W.P. or	1 lb.	Long residual action. Observations indicate that many foliar insects may be well controlled.
	Sevin 50% W.P. or	2 lbs.	Effective against a broad range of insects.
	Lindane 25% W.P. or	1 lb.	Good residual action.
	Malathion 50% W.P.	4 lbs.	Double strength in the fall for gall-producing-type aphids is especially effective.
Cankerworms	DDT 50% W.P. or	2 lbs.	
	DDT 25% E.C. or	1 qt.	Usually, one application as the leaves are unfolding is sufficient for effective control.
	Lead Arsenate or	3-4 lbs.	
	Methoxychlor 50% W.P.	2 lbs.	
Mites	Tedior.® 25% W.P. or	1 lb.	Kills eggs and young mites. Slow kill of adults. Extremely long residual action — 6 to 10 weeks.
	Aramite 15% W.P. or	2 lbs.	Summer use for adults and young mites.
	Ovex 50% W.P. or	Deciduous-1 lb. Evergreen-2 lbs.	Kills eggs primarily.
	Malathion 25% W.P. or	4 lbs.	Use on protective schedule.
	Ethion .67 Superior 60 Oil E.C.	2-3 qts.	Apply when mites first appear.
Gypsy Moth	DDT 50% W.P. or	2 lbs.	
	Lead Arsenate or	3-5 lbs.	Apply as close to egg hatching as possible.
	Sevin 50% W.P.	2 lbs.	
Borer Caterpillar Type	DDT 25% E.C. or	1 gal.	
	DDT 50% W.P.	4 lbs.	Dates of application vary considerably. The insect species and the host to be treated are different. For detailed recommendations consult your pesticide supplier or technical advisor.
Grub Type	Lindane 20% E.C. or	2 qts.	
	DDT 50% W.P.	4 lbs.	
Leaf Miners	Lindane 25% W.P. or	1 lb.	
	Malathion 25% W.P. or	4 lbs.	Materials used against adults may require second application 10 days later. Observation of mining within the leaves is required for efficient timing of larval sprays.
	Sevin 50% W.P. or	2 lbs.	
	DDT 50% W.P.	2 lbs.	
Scale Insects	Superior 70 Second Oil or	2-3 gals.	For Dormant Sprays. (Thorough coverage is necessary)
	Ethion Superior Oil or	2-3 gals.	
	Malathion 25% W.P. Plus	4 lbs.	
	DDT 50% W.P. or	2 lbs.	For Foliar Sprays — directed against the crawler stages.
	Sevin 50% W.P. or	2 lbs.	
	Ethion .67 Superior 60 Oil E.C.	2-3 qts.	Apply when eggs hatch or when summer crawlers first appear.
Elm Leaf Beetle	DDT 25% E.C. or	1 qt.	
	DDT 50% W.P. or	2 lbs.	Where resistance to DDT is suspected, lead arsenate or Sevin are logical choices. Sevin 85W may be substituted where mist blowers are utilized.
	Lead Arsenate or	5-6 lbs.	
	Sevin 50% W.P.	2 lbs.	
European Elm Bark Beetle	DDT 25% E.C. or	8 gals.	**Dormant****
	Methoxychlor 25% E.C.	8 gals.	Hydraulic sprayers — 8-12 gallons of finished spray should be applied per tree.
	DDT 25% E.C. or	**Mist Blower Usage** 12% emulsion	**Dormant** For concentrate sprayers, use 46 gallons of either E.C. to 54 gallons of water. Spray at least 2-5 gallons of finished spray per medium to large tree.
	Methoxychlor 25% E.C.	12% emulsion	
	** If summer applications are needed — DDT (1%) for hydraulics and DDT (6%) for mist blowers may be used.		
Anthracnose	Puratized Agricultural Spray	1 pt.	Spray in early spring before buds swell, and again before the leaves unfold. Follow dormant application with one or two applications at weekly intervals depending upon the rainfall.
	Zineb	2 lbs.	
Powdery Mildew	Kolospray (sulfur)	4 lbs.	Apply midsummer on lilac. Avoid spraying at high temperatures.
Leaf Spot	Puratized Agricultural Spray or	1 pt.	Helpful for leaf spot on walnut, elm, and maple.
	COCS or	4 lbs.	
	Ferbam	1-2 lbs.	Preventive treatments are suggested where severe in past seasons.

and lindane has been recommended for some of the grub types.

Leaf Miners

There are many species of leaf miners — elm, birch, and oak leaf miners, to name but a few. Injury resulting from these pests frequently appears as blotches or blisters on the foliage. Partially or completely mined leaves turn brown and are very noticeable.

Loss of leaves is one end result of attack by the birch leaf miner. This damage is usually confined to newly developing foliage. Beyond the second generation, birch miners generally invoke little damage except for such feeding as is necessary to maintain their population. Repeated leaf losses can cause death or weaken the tree, making it susceptible to attack by other insects or diseases. Hence, treatment to curb infestations before they get out of hand is vital.

In June, the adults deposit their eggs either on the foliage or in the leaf tissue. Once eggs hatch the tiny larvae begin feeding between the upper and lower surfaces of the leaves. Birch leaf miners may have as many as four generations per year; oak leaf miner up to three. Adults of many leaf miners are tiny, two-winged, black midges or flies. The mature birch leaf miner, however, is a small, black, four-winged wasp-like sawfly.

Leaf miners are relatively difficult to curb. Timing is critical. lindane, applied when leaves are expanding and small blisters or mines are just becoming evident, has given a good degree of control.

Larval stages of leaf miners may be curbed by applications of lindane in the latter part of May for the birch leaf miner, and in early June for elm leaf miners. Treatment with malathion is also effective for control of birch leaf miners.

Scale Insects

Because of their small size and general appearance, scale insects are often overlooked until injury has reached advanced stages. This is often the point where it becomes too late to save part or all of the trees attacked.

Scale insects have a tremendous potential for reproduction. Preventive control sprays are advisable in areas where these pests are known to be active from year to year. Treatment with appropriate chemicals should be made on a "planned" schedule, not merely once damage is evident.

Injury caused by scale insects can be extensive, manifesting itself in any of four ways: (1) reduction of growth; (2) abnormal growth; (3) death of the host plant; (4) secretion of an unsightly sticky honeydew substance.

Scale insects are members of a large and complex family. For purposes of discussion, they can be divided into three groups. The first is the covered or armored scale insects, which include such pests as oystershell, euonymus, San Jose, and others. At varying intervals, the young of this species crawl out from under the protection of the female's shell or scale. After a short period of activity, they find a favorable location on the host to insert their threadlike mouthparts and feed by sucking the sap. Soon they lose their skins, and, if female, their legs and antennae also. The females combine cast skins with exudations of wax and form them into coverings. After the fourth molt (growth stage), the males soon become minute two-winged insects.

The second type is the naked or soft scale insects. Included here are such common pests as the cottony maple scale and lecanium species. They are usually humped and resemble the shell of a turtle, are not protected by a separate waxy scale or shell, and perhaps most important, frequently move from place to place while feeding and may crawl back to the twigs in the fall of the year.

A third type of insect closely related to the scale group is the mealybug. Types are too numerous to list at length.

For best results in controlling scale insects it is important that correct identification of the species be made. As with many other pests, timing of spray applications for scale insects is critical. This is especially true with the covered scales where the young come out from under the protective female shells and crawl around. The crawler stage is the best time to

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control these scales. Time of spray applications can vary from April through September, depending upon the species and number of generations per year. Recommended materials include Ethion Superior Oil or Superior 70 Second Oil for dormant sprays. Sevin, a malathion-DDT combination, or the Ethion .67 Superior 60 Oil E. C. are excellent choices for foliar sprays.

Elm Leaf, Elm Bark Beetles

In recent years many cases of the dreaded Dutch Elm Disease have been traced to the feeding habits of the European elm bark beetle, aided by the widespread and highly destructive elm leaf beetle. It has been found that severe attacks of elm leaf beetles upon the foliage weaken elm trees and make them attractive breeding grounds for elm bark beetles, which we now know are carriers of Dutch Elm Disease.

Large infestations of elm leaf beetles will cause leaves to yellow and fall prematurely. The adult insects are about ¼ inch long. Those found in spring and summer appear quite yellowish with dark stripes along the sides, while in the fall and winter, they are a more uniform olive green.

European elm bark beetles are reddish brown in color with pitchy, red wings, and approximately ⅛ inch long. The rear portion of their bodies appears to have been chopped off abruptly. These pests feed on small twigs, particularly in the crotches of healthy tree branches. The breeding galleries made by the adult female beetles beneath the bark of weakened or dead trees range from 1 to 2 inches long and contain 80 to 140 eggs per adult gallery.

For effective control of the bark beetle a thorough dormant application is required. As a supplementary measure, a spray in mid-July is also advisable.

In curbing leaf beetles, sprays should be applied when leaves are ¾ grown or as soon as feeding is noted (usually late May or early June). A second dosage in midsummer may be needed, particularly if only some of the trees in the area have been sprayed previously.

DDT is suggested as a dormant spray for elm leaf and elm bark beetles. For late spring and summer sprays, DDT, lead arsenate, or Sevin can be used to halt both pests. New work by several research groups indicates that Thiodan® insecticide will probably be labelled for the control of both pests.

Significant Disease Pests

In addition to the many insect pests which threaten shade trees each spring and summer, there are fungus problems to beware as well. A few of the more significant disease pests are cited here to aid in recognition and control.

Anthracnose

Anthracnose is a fungus which overwinters in leaves and cankers and attacks the twigs or leaves of ash, linden, horse chestnut, maple, oak, sycamore, and certain other hardwoods. Oak and sycamore are both attacked by one particular species of this pest, while each of the other varieties is plagued by a different species. Thus, leaf injury to various types of trees differs

How to spot & control danger in turfgrasses - forests - ponds

Couch:
DISEASES OF TURFGRASSES
by Houston B. Couch, Department of Plant Pathology, Pennsylvania State University.
1962. 304 pages. $11.00
Consulting Editor: J. Ritchie Cowan

"Nearly 100 pages are given over to analysis of turfgrass disease chemicals, and grasses susceptible to ailments. Arranged both by common and technical names, these tables provide a handy guide which could be used by technical directors and servicemen alike. Couch's new text is more than a handbook, however. In the first 178 pages, the distinguished author delves insistently into the rudiments of both fungus and nematode-incited diseases, and gives valuable pointers on how to tell one disease from another. Another highlight of the volume are the illustrations, both full color and black-and white, which give vivid reinforcement to the details set forth in the text." — *Pest Control*

Graham:
CONCEPTS OF FOREST ENTOMOLOGY
by Kenneth Graham, Professor of Forest Entomology, The University of British Columbia, Vancouver.
1963. 392 pages. $9.50
Consulting Editor: Peter Gray, University of Pittsburgh.

"Practical uses of theoretical information about the detrimental effects of insects in forests is offered in the latest of Reinhold's biological books . . . Insects are not treated superficially; rather, in-depth discussion on the pest and the manner in which it damages trees, whether by boring, leaf mining, or root chewing, gives the student of forestry a sound basis upon which to determine timber loss. A table is included which sets forth the principal insects found in forests and what part of trees they damage. This makes damage detective work simpler . . . a refreshing, practical slant that pinpoints the study of entomology in the scheme of forest management." — *Pest Control*

Bennett:
MANAGEMENT OF ARTIFICIAL LAKES AND PONDS
by George W. Bennett, Aquatic Biologist and Head of the Aquatic Biology Section, Illinois Natural History Survey, Urbana.
1962. 320 pages. $8.00
Consulting Editor: Peter Gray, University of Pittsburgh.

"The author has included the most recent scientific advances and practical techniques in artificial lake and pond management. For those interested in a comprehensive and integrated presentation of the dynamics and management of warmwater fish populations in artificial lakes and ponds, this is just the book." . *Commercial Fisheries Review*

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slightly in coloring, size, and extent.

Two principal types of injury are usually distinguishable. One is early leaf blight which results in the complete killing of young leaves during April or May. This type of injury varies from partial to complete defoliation of tender leaves and is similar to frost injury in appearance. It is most common on sycamore. The second type of injury shows up later in the season as irregular brown areas adjacent to and surrounding diseased spots on midribs and lateral veins of mature leaves. This type rarely causes serious defoliation, but the fungus may spread through the twigs into younger branches, producing cankers which in turn can cause twig and branch dieback.

As with many other tree pests, successful control by spraying depends on the frequency and the thoroughness of application. A suggested schedule follows:

(1) Just before the buds start to swell in the early spring.
(2) When the buds are breaking and before the leaves unfold.
(3) One or two applications at weekly intervals depending upon the amount of rainfall.

The following treatment is suggested in curbing anthracnose: Puratized Agricultural Spray (a mercury compound spray) — 1 pint per 100 gallons of water applied in the dormant stage followed by 2 treatments of Zineb (2 pounds per 100 gallons of water).

Powdery Mildew

Extensively distributed and occurring on a wide variety of plants, the powdery mildews have distinguishing characteristics which enable specialists to identify them. The powdery mildews are important in this country on maple, oak, alder, elm, poplar, and willow.

The damage caused by this disease is usually slight except when young trees are attacked. The powdery mildews are usually confined to the upper or lower surfaces of leaves, forming a white superficial growth visible to the naked eye. Occasionally, when conditions are right, and the infestation is severe, the mildews will progress onto fruits and twigs of the host. In addition to covering the surface of the leaf, the mildews also produce a sucking organ which penetrates the cells of the host to withdraw food. The spores of the developing mildews are readily carried by the wind and spread the fungus widely during summer months. The fungus overwinters in the black fruiting bodies found on fallen leaves, ruptures in the spring, discharging the spores which are carried by air currents to infest new foliage.

The powdery mildews definitely create an unsightly condition on the leaves of the host trees, but they may be checked during the growing season by use of a sulfur dust or spray at weekly intervals. Burning the fallen leaves in autumn is also quite helpful in a small or confined area.

Citywide programs for controlling shade tree pests are frequently handled by CAs. Spraying shown above is part of a Japanese beetle control program in Sacramento, Calif.

Leaf Spots

Leaf spots on trees can be caused by insects, toxic gases, bacteria, and fungi. Leaf diseases such as this can be important when defoliation results or when the infestation is so severe that most all the leaves are involved and cannot function normally. Defoliation for several successive years *may* bring about the death of hardwoods. Species of trees commonly infested by the leaf spot fungi include: elm, chestnut, oak, red maple, hickory, ash, locust, and sycamore.

Characteristic of leaf spot is the formation of dead areas in the leaf. Size and shape of the area can vary from small to large and round to irregular. The deadened tissue varies in color from yellowish to all shades of brown and black. Some of the dead areas frequently fall out, leaving holes (sometimes called "shot hole").

The spread of the leaf spot fungi is basically the same with all species. They overwinter in the old fallen leaves, develop and spread to the newly developing leaves in the spring. Wet seasons favor increased infestations of leaf spot.

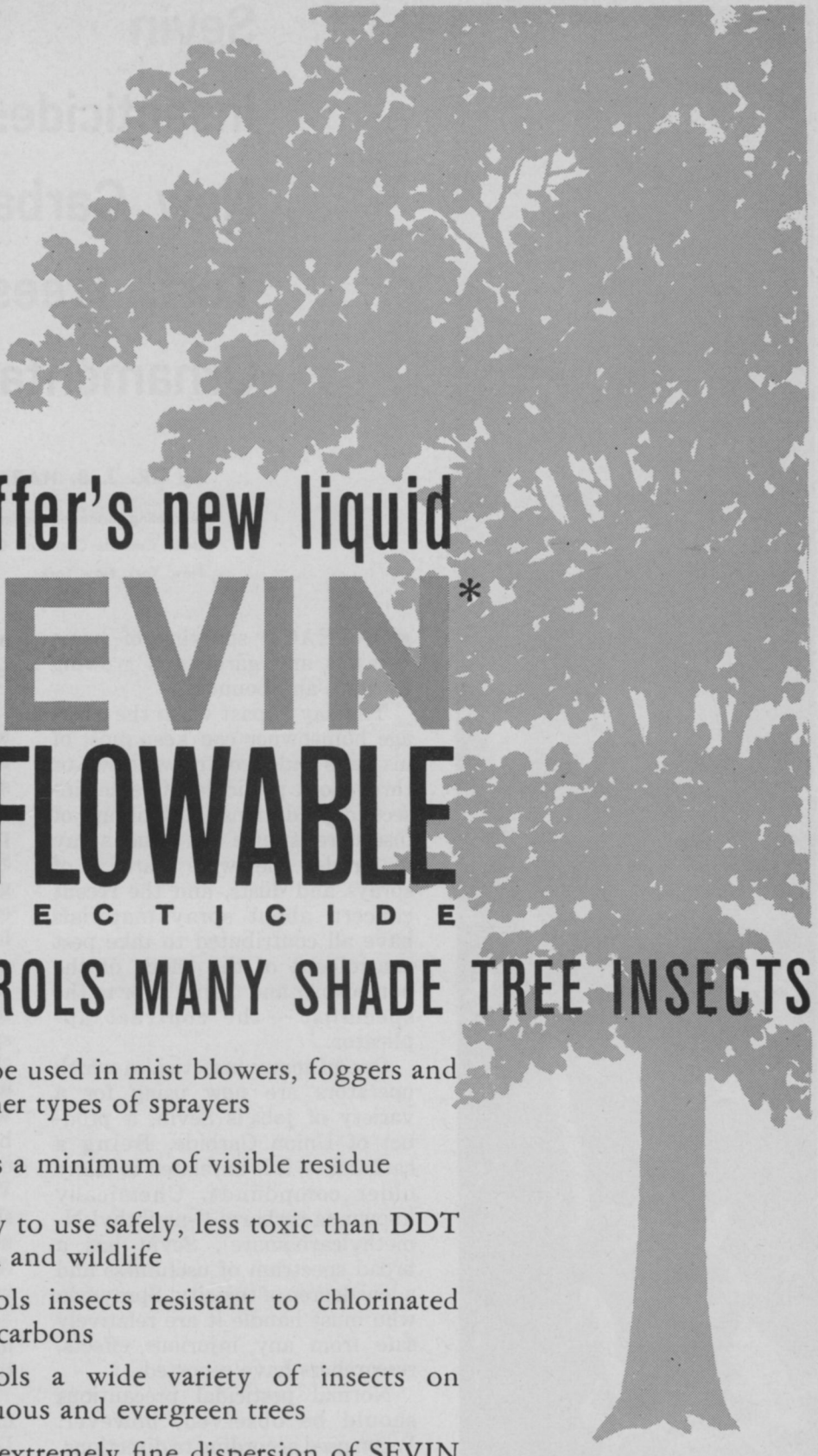
Recommendations for control include the burning of fallen leaves in the fall. Dead and cankered twigs should be pruned out before the buds break in the spring. If infestations are severe, spraying with ferban or COCS (copper oxychloride-sulfate) is helpful. Puratized Agricultural Spray (mercury compound) is also useful in the control of leaf spot of walnut, elm, and maple.

Subsoil Problems Blight Lawns

Dead spots on lawns or patches that yellow during dry weather may be an indication of subsoil problems, according to Vaughn H. Holyoke, assistant crops specialist with the Cooperative Extension Service, University of Maine, Orono.

Pockets in subsoil, 4″ to 8″ below the top, can collect water in fall and winter, causing winterkilling, Holyoke explains.

"These areas can be the starting point of a severe weed problem, as well," Holyoke adds. In established lawns, turf renovation is the only solution to subsoil problems, so be sure to watch out for it when establishing new lawns, Holyoke warns.



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Sevin Insecticide: New Carbamate for Turf, Trees, and Ornamentals

By DR. J. B. HARRY

Marketing Manager, Agricultural Products
Union Carbide Chemicals Company
New York, New York

CONTRACT spraying of home lawns and gardens is growing by leaps and bounds.

The day is past when the average homeowner can keep most of his pests under control with two or three stock pesticides. Greater insect depredations, a buildup of insect resistance to some spray materials, the wide variety of sprays and dusts, and the recent concern about spray materials have all contributed to take pest control out of the hands of the homeowner and turn it over to the specialist — the contract applicator.

One of many insecticides which operators are now using for a variety of jobs is Sevin, a product of Union Carbide. Being a carbamate, it is unrelated to many older compounds. Chemically known as carbaryl (l-naphthyl N-methylcarbamate), Sevin has a broad spectrum of usefulness and a low degree of toxicity. Spraymen who must handle it are relatively safe from any injurious effects, researchers have reported.

Normal pesticidal precautions should be observed, however. When used according to directions, though, Sevin is not likely to bother customers' children or pets if they come into contact with it on foliage. If it drifts, it will not contaminate crops or harm domestic animals, small game, or fish, when used at the prescribed rates. It is said to be 200 times safer to goldfish, than is DDT.

Formulations Available

Sevin insecticide is available as a 50% wettable powder, an 85% microfine wettable powder, several liquid formulations including a suspension of 4 pounds per gallon of active material (called Sevin 4 Flowable), 5 and 10% granular formulations, and dusts, each produced by various formulators.

There are some formulating details of which CAs should be informed. To maintain quality of spray preparations, formulations should be mixed accurately and with care. To a partly filled tank with agitator operating, Sevin can be added along with any other emulsifiable formulations desired. While spraying, the agitator should continue operating so as not to let the preparation settle. After spraying, flushing with clean water will eliminate residues.

Separable suspensions of Sevin insecticide should not sit in the tank overnight.

Sevin is compatible with commonly used insecticides such as DDT and other chlorinated hydrocarbons. Compatible organic phosphate compounds include Guthion, malathion, and parathion. Botanicals are also compatible with the product. Fungicides which may be applied along with Sevin include glyodin, organomercury compounds, fixed cop-

pers, dithiocarbamates, sulfur, captan, Cyprex, and Phaltan.

Sevin should not be mixed with any alkaline materials. Bordeaux, lime, lime sulfur, and casein-lime will lessen effectiveness of this new compound.

All common miticides are compatible with the chemical, which is an advantage because Sevin alone does not control certain kinds of common mites.

Sevin controls many insects that have built up resistance to chlorinated hydrocarbon and phosphate insecticides. According to Dr. Edward J. Duda, director of the Bartlett Tree Research Laboratories, Sevin has a good residual effect, and has given up to two and three weeks control of insects such as lace bugs on oaks and sycamores.

Bartlett experts have also had good results using Sevin on birch, oak, and boxwood leaf miners, Japanese beetles (which seem to be moving from gardens into rougher areas), chinch bugs, leaf tiers, tent caterpillars, cankerworms, and periodical cicadas (17-year locusts).

Cicadas were especially troublesome in sections along the East Coast in 1962, and are scheduled to appear over a broad band in the east-central United States in 1963.

Experiments with Sevin insecticide on a variety of ornamentals and shade trees have demonstrated it to be effective for controlling most common tree pests.

Cicada Control

Cicadas are controlled by preparing a 2% suspension of wettable powder; approximately a gallon of this is applied to each 50-foot tree. Application should be delayed about 10 days after emergence from the ground; this is the time when female cicadas begin laying eggs in twigs of trees.

Other pests on which Sevin has been successful include bagworms, elm leaf beetles, rose aphids and slugs, lecanium scales, and pine leaf aphids.

Sevin is not only useful on lawns (for earwigs, armyworms, fleas, leafhoppers, millipedes, sod webworms, and mosquitoes, as well as chinch bugs), but against insects on home-grown tree fruits, most of the small fruits and nuts, vegetables, rose bushes, garden flowers, and shrubs at 1.0 to 2.0 lb. of 50% wettable powder per 100 gallons of water, or 1 qt. 4 Flowable per 100 gallons of water.

For best results against chinch bugs, lawns in infested areas should be sprayed about the time the young insects are hatching, when temperatures rise into the 70s. One and one-quarter pounds of 85W in 150 to 200 gallons of water will treat 5000 sq. ft. (or 2 lbs. of 50W in the same amount of carrier). This is the same as 1 lb. actual Sevin per 5000 sq. ft.

According to Dr. Louis Pyrenson of the Long Island Agricultural and Technical Institute in Farmingdale, N.Y., best results are obtained when the lawn is mowed and given a good wetting with a sprinkler before applying the insecticide. This brings the bugs to the lawn surface. After application, the turf should be wet down with clear water.

One application of Sevin is capable of controlling an entire generation of chinch bugs. Applications may have to be repeated after 2 or 3 weeks if young of a new generation begin to appear.

CAs who spray flower gardens for insect pests can use Sevin on a wide variety of nonwoody plants including asters, begonias, mums, dahlias, gladiolas, iris, marigolds, orchids, roses, and zinnias. The shrubs include andromedas, azaleas, camelias, euonymus, hydrangeas, laurel, lilacs, rhododendrons, rose of Sharon, and yews, at 1 lb. active ingredient per 100 gallons of water.

On ornamental trees the list includes arbor vitae, ashes, birches, bamboos, cypress, dogwoods, elms, firs, hemlocks, hickories, junipers, magnolias, pines, sassafras, redbuds, and others. But avoid using Sevin on Boston or Japanese ivy, since it may injure these plants, experimenters discovered.

Sevin poses slight hazard to desirable birds and other animal species, according to James K. Keith, a research biologist with the U. S. Fish and Wildlife Service of the Department of Interior. "Our work to date with Sevin insecticide indicates that it has a low potential hazard to wildlife and that it is one of the more desirable pesticides for use where wildlife values are of consideration," Keith has stated.

Know Your Species

HOARY CRESS
(Cardaria draba)

Aliases of hoary cress are: perennial peppergrass, hoary pepperwort, and white-top. This alien weed of the mustard family is a perennial which reproduces by seed and by sprouting of rootstocks. It is found in New England, and some mid-coastal states, through the Midwest to the Pacific. Hoary cress seems best adapted to cool climatic conditions such as those found in the Rocky Mountain region.

Stems (4) of hoary cress grow singly straight up, 1-2 ft. tall, branching only at the top. Stems and leaves are hairy. Lower leaves have obvious petioles (stalks) and are spatula shaped with slightly scalloped margins. Higher up on the stem, leaves lose their petioles and appear to clasp the stem (5).

Flowers on separate stalks are arranged in clusters at nearly the same height on the ends of all branches. Flowers are typical of mustards (family Cruciferae), with four tiny white petals in the shape of a cross. As branches grow, flowering at the ends continues; flowers still bloom after lower seeds have matured (1).

Seed pods (2) are heart-shaped, bulbous, attached to the flower stalk at the broad end of this heart-shaped pod. A pod holds two oval seeds, each 1/16 inch long. Seeds are reddish brown and have a rough texture (3).

Roots of hoary cress are slender and many-branched, sometimes penetrating soil to a depth of 10 feet. It is the ability of roots to regenerate tops which makes this weed so difficult to control (6).

Other plants, much easier to control, which may be confused with hoary cress are members of its own family; all have white flowers. Peppergrass, *Lepidium virginicum*, is not a perennial, is easily pulled up, does not have clasping leaves, and has circular flattened seed pods. Field peppergrass, *L. campestre*, does have clasping leaves, but they are arrow-shaped (saggitate); seed pods are more boat-shaped.

Pennycress, *Thlaspi* sp., looks somewhat like hoary cress but has no hair on the leaves and has very flat and rounded pods. Shepherd's purse, *Capsella bursa-pastoris*, has saggitate, clasping leaves and seed pods are heart-shaped, but they are attached at the narrow end of the pod and are more flattened than those of hoary cress.

Repeated applications of 2,4-D will control hoary cress if applied at the late vegetative to early bud stage of growth. Combinations of leachable soil sterilants such as sodium chlorate, fenac, TBA, boron compounds, substituted urea compounds, and triazines may be used effectively. These herbicides also kill most other plants.

Where sterilization may cause undesirable erosion, planting over with vigorous grasses after application of a contact herbicide eventually controls hoary cress especially with well-timed 2,4-D treatments.

Prepared in cooperation with Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.

(DRAWINGS FROM NORTH CENTRAL REGIONAL PUBLICATION NO. 36, USDA EXTENSION SERVICE)

"Industry Hour" to Highlight Fla. Turf Show, Aug. 27-29

New event added to the 11th Annual Florida Turf Conference, scheduled for the University of Florida, Gainesville, Aug. 27-29, will be an "Industry Hour."

Featured will be chemical and fertilizer products for turf. Each firm that exhibited these products at the Second Annual Trade Show (See *Weeds and Turf*, July 1963, p. 16), will be eligible to participate. Plans are now being made to continue this event each year, with a new theme being selected each time.

Although final program details and confirmation of speakers are not yet completed, general outline of the Conference will follow those of recent years. "Insects" will be theme of the general sessions, which open Tuesday afternoon, August 27.

Professional discussion sessions will be held Wednesday morning, with sections devoted to golf turf; playfields, parks, and cemeteries; retail dealers and garden suppliers; horticultural spraymen and lawn service agencies; and turf nurseries. Tour of turf plots and a barbecue, with the banquet that evening, will conclude Wednesday's sessions.

Conference will close Thursday morning, with a general session devoted to 1963 Turf Research Reports.

For more information on the program, or advance registration forms, write to Richard C. Wallace, Executive Secretary, Florida Turf-Grass Assn., P.O. Box 5284, Jacksonville, Fla.

Velsicol Has Bandane Booklet

Information on Bandane, a new pre-emergence crabgrass control from Velsicol Chemical Corp., is available to CAs in a new pamphlet from that firm.

Bandane has a mild selective action, and will not harm seeds, seedlings, or desirable grasses, according to the company. In addition, one application will eliminate ants and grubs from turf for several seasons, Velsicol claims.

For more information, write to the company at 330 East Grand Ave., Chicago 11, Ill.

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This quartet of tree experts paused to examine results of the severe midwestern winter while attending the International Shade Tree Conference Ohio Chapter meeting in Cleveland. Left to right are John Michalko, Cleveland Commissioner of Shade Trees; Dr. L. C. Chadwick, group secretary-treasurer; Dr. Paul E. Tilford, executive secretary of the National Arborists Association; and George Kase, Cincinnati Park Board, president of the Ohio organization.

Ohio Shade Tree Conference Laments Severe Winter and Hot, Dry Summer

"Because of a tough winter, which caused us to lose a lot of young trees, and the current drought in the Midwest, we're having a hard time of it," John Michalko, Commissioner of Shade Trees for the City of Cleveland, told delegates to the Ohio Chapter of the International Shade Tree Conference.

Nearly 80 arborists, tree company supervisors, and utility foresters gathered July 10 at the Cleveland Municipal Shade Tree Headquarters for the annual meeting, which featured tours of outstanding tree plantings in the Cleveland area, and a demonstration of some new tree maintenance equipment.

Michalko's remarks preceded a report from Dr. L. C. Chadwick, secretary of the Ohio group, who reported that the Buckeye tree organization, with a membership of 191, is now second in size only to the California chapter.

During the business session, chaired by president George Kase, of the Cincinnati Park Board, delegates voted to incorporate the Ohio chapter.

After the equipment show, the Ohio treemen moved to the Cleveland Museum of Art for additional talks on the role of tree personnel in urban redevelopment.

"There used to be a conflict between municipalities and electric companies over trees," Lee Howley, vice president and general counsel of the Cleveland Electric Illuminating Company, told the assembly.

This conflict is being resolved, however, through such programs as CEI's Master Tree Plan, which helps municipalities plan tree plantings which will not interfere with utility lines, traffic, or sidewalks and sewers, and which will still enhance the esthetic character of a city's neighborhoods.

Next meeting of the Ohio Chapter will be in the last week of January in Columbus. Exact dates will be announced later, Dr. Chadwick told *Weeds and Turf*.

Meeting Dates

Alabama Nurserymen / Southern Nurserymen Annual Convention, Hotel Admiral Semmes, Mobile, Aug. 4-6.

International Shade Tree Conference, Royal York Hotel, Toronto, Ontario, Canada, Aug 4-9.

Rutgers Turfgrass Field Days, Rutgers University College of Agriculture, New Brunswick, N.J., Aug. 7-9.

11th Annual University of Florida Turfgrass Management Conference, University of Florida, Gainesville, Aug. 27-29.

Nurserymen and Growers Annual Short Course, University of Florida, Gainesville, August 28-30.

Midwest Turf Field Day, Purdue University, Lafayette, Ind., Sept. 9 (repeated Sept. 10).

70th Annual Farm Equipment Institute Convention, Roosevelt Hotel, New Orleans, La., Sept. 29-Oct. 2.

International Shade Tree Group Has Varied Convention Program

A program designed to satisfy tree specialists from all phases of the industry highlights the 39th Annual International Shade Tree Conference this month in Toronto, Ontario, Canada.

Nearly 800 delegates are expected to register during the 6-day tree seminar which runs from August 4 to 9 at Toronto's Royal York Hotel.

Much of the program is devoted to discussions of tree pest control, including talks on non-infectious tree diseases. Moderated by Dr. Spencer H. Davis, ISTC vice president, these tree ailment talks include "Ash Dieback in the Northeast," "Maple Decline in the Northeast," and "Sweet Gum Blight."

Role of tree surgery in modern arboriculture is the subject of an address by C. L. Wachtel, Wachtel Tree Science and Service Co., Wauwatosa, Wis.

Concepts of soil aeration and the relationship of this process to tree growth are being examined Monday by George Yelenosky from the Department of Botany, Duke University, Durham, N. C.

Split sessions are scheduled for Tuesday to better accomodate the varied interests of conference delegates. In the series of talks geared to members of the National Arborists Association, markets and public relations are covered.

"Shade Tree Spraying — the Tree, the Public, the Arborist" is the title of a talk by Henry F. Davis, Lowden Tree Specialists, Inc., Needham, Mass. "New Markets for Tree Service" is being presented by Robert Felix, Harder Tree Service, Inc., Hempstead, N. Y.

Also on Tuesday, those interested in municipal arboriculture may attend discussions chaired by John G. Michalko, chairman of the ISTC's Municipal Arborists Committee.

A significant talk on the real facts behind pesticide usage, presented by Dr. George C. Decker, distinguished entomologist of the Illinois Natural History Survey, Urbana, is in the offing Thursday.

A detailed report of the conference will appear in W&T next month.

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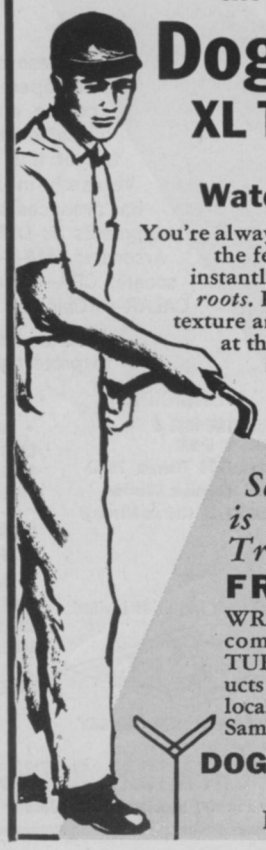

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Proper Fungicide Use Detailed

For best results in controlling plant diseases, fungicides must be used properly, Dr. R. E. Partyka, Ohio State University extension plant pathologist, advises. He suggests the following precautions in applying fungicides:

1. Read label carefully, and follow directions exactly;

2. Be certain to use proper material for exact crop and disease, as some fungicides may injure certain crops;

3. Since fungi do not move about on leaf surfaces, proper coverage is essential; make certain all foliage is thoroughly covered;

4. Measure material accurately, since too little will not give good protection, and too much may cause injury or give excess residues;

5. Apply at regular intervals, because organic breakdown and growth of new leaves may eliminate effectiveness; a 7-10 day application interval is recommended;

6. Wash hands before eating or smoking; and

7. Store fungicides in a safe place.

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Trimmings

A challenge to Rachel. We just received in the mail a printed duplicate of a letter from McMahon Brothers to Rachel Carson, author of *Silent Spring*, the book which kicked off all the pesticide investigations. Signed by Robert J. McMahon, president of the Binghamton, N.Y., contract applicating firm, the letter pointedly challenges Miss Carson to stand behind her allegations. Says Mr. McMahon to Miss Carson: "All of the roads and highways in Delaware are under one highway system. We will treat all the roads on one side in the same manner we recommend to our customers. You could treat all of the roads on the other side with the methods you propose." Then, the letter goes on, after adequate tests of costs and safety factors, McMahon Brothers, if proved wrong, will pay to Miss Carson an amount equal to all their profits from highway weed and brush control since the first day the company incorporated. "If, however, you are wrong," the letter goes on, "you will agree to pay us all of the profits and royalties from your books over the same period of time." While it is doubtful such a contest could be enacted, this dramatic challenge underlines the need for analysis of the *facts*, not fancies, of roadside spraying, and should be an effective public relations piece for McMahon.

* * *

Florida weedmen in news. **Down in Miami, where the climate is a real boon to weed growth, chemical herbicides are very much in the news, thanks to the Miami Herald's garden editor, Nixon Smiley, and a trio of turf experts that includes veteran sprayman Charlie Johnson, whose company is in Miami; Dr. Evert O. Burt, University of Florida turf specialist; and Ralph White of Ousley Sod Company in Pompano Beach. A recent Sunday edition of the Herald devoted a whole page of the garden section to the problems of lawn weed control, and headlined an article on types of chemical weedkillers by the three crack turfmen mentioned above. A nice piece of publicity for the turf industry in general, this kind of recognition is a special plum for Florida applicators and turf supervisors.**

* * *

Feather-in-cap department. James S. Wood, president of Superior Fertilizer and Chemical Co. of Tampa, Fla., has been elected to the Board of Governors of the National Plant Food Institute, we learned recently. Since only 12 chemical company executives were added to the board at the NPFI meeting in White Sulphur Springs last month, it is a particularly significant honor for the Florida fertilizer manufacturer.

* * *

On the move. **Several staff changes in horticultural and botany departments around the country were announced recently. Up in Connecticut, Dr. Hubert B. Vickery, distinguished plant physiologist, has retired and accepted the title of biochemist emeritus. In neighboring Massachusetts, Prof. Grant Snyder is retiring as head of the U. of Mass. horticulture department, ending a career of 41 years in plant sciences. Across the country at the University of New Mexico, Dr. Fred B. Widmoyer, formerly at the University of Connecticut, becomes new horticulture chief. Congratulations to all involved!**

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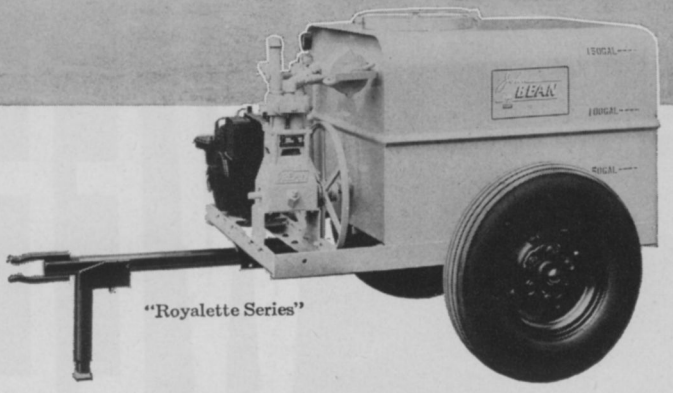

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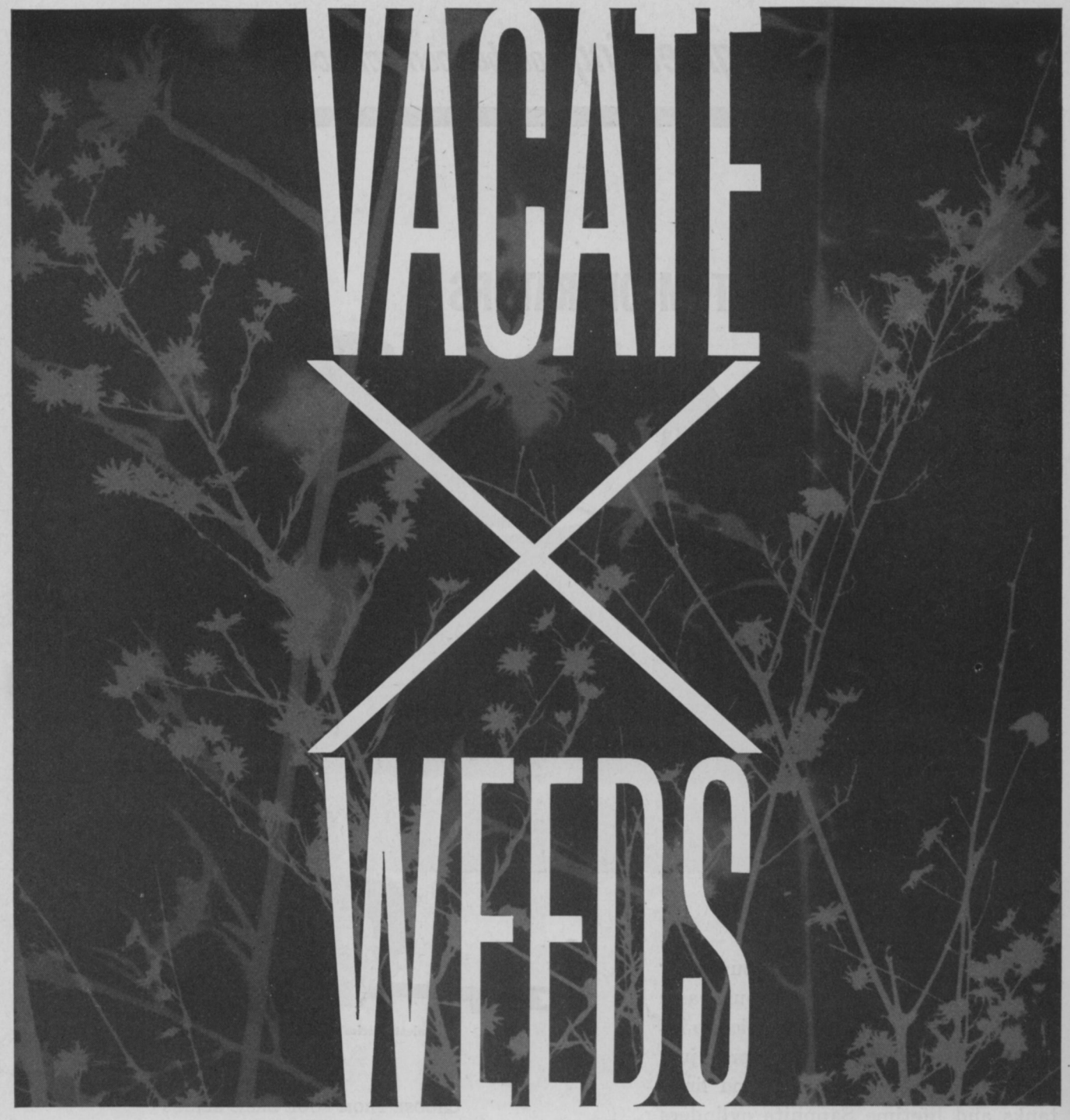

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